

# Comparisons of vertical solvers with the warm bubble simulation.

A rising thermal in an isentropic atmosphere.

$$\theta' = 2^\circ C / H_\alpha = 125 \text{ m},$$

centered at 260 m above the ground

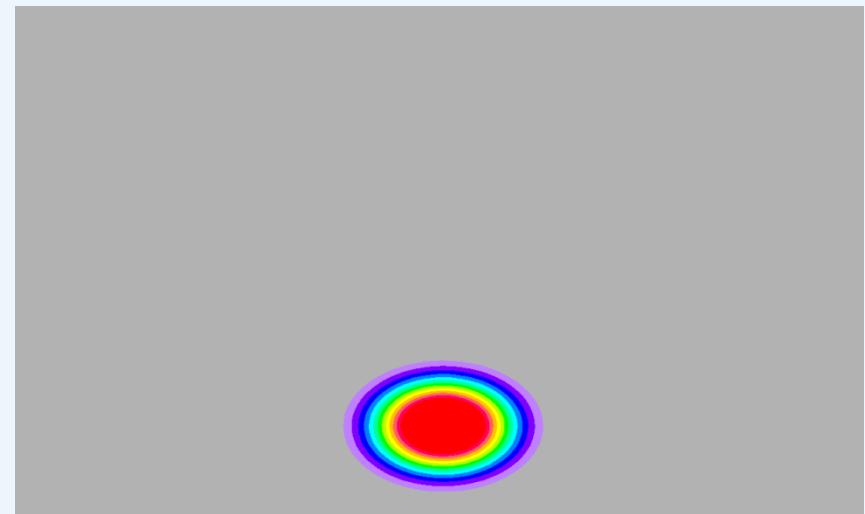
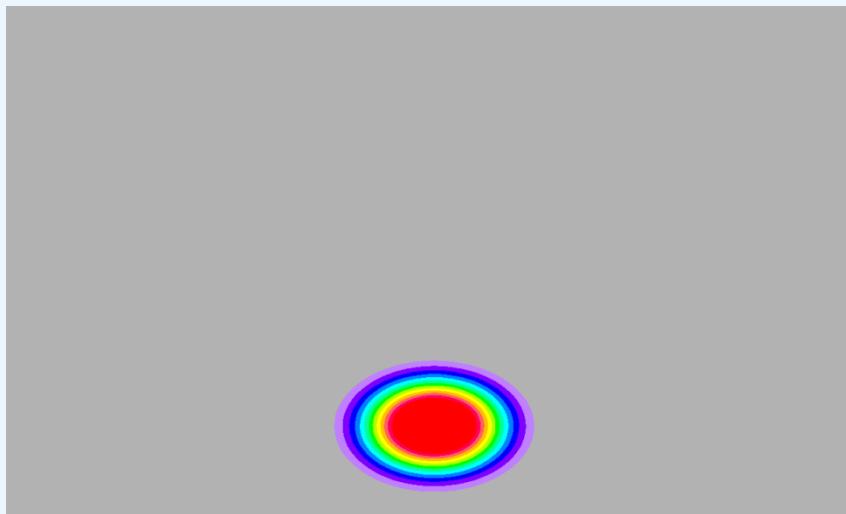
$$\Delta x = \Delta z = 10 \text{ m}$$



# Explicit .vs. Implicit tri-diag solvers

$\theta'$  t= 0.0 min

$\theta'$  t= 0.0 min

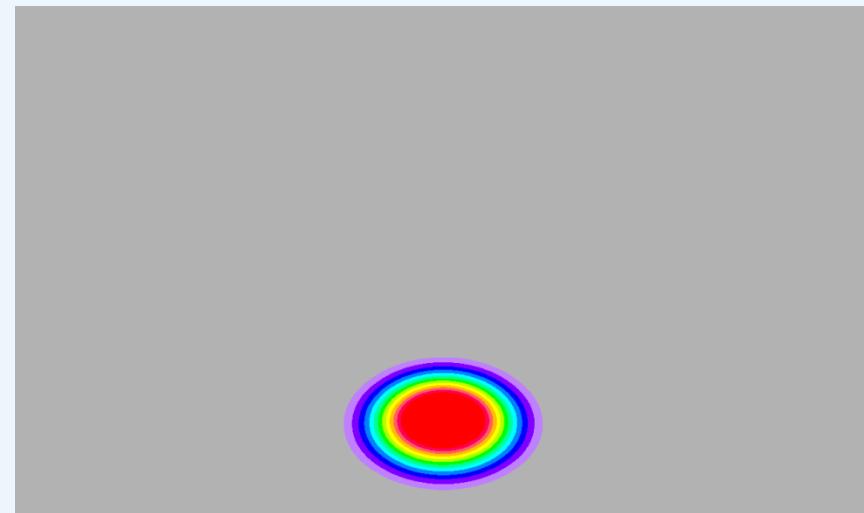
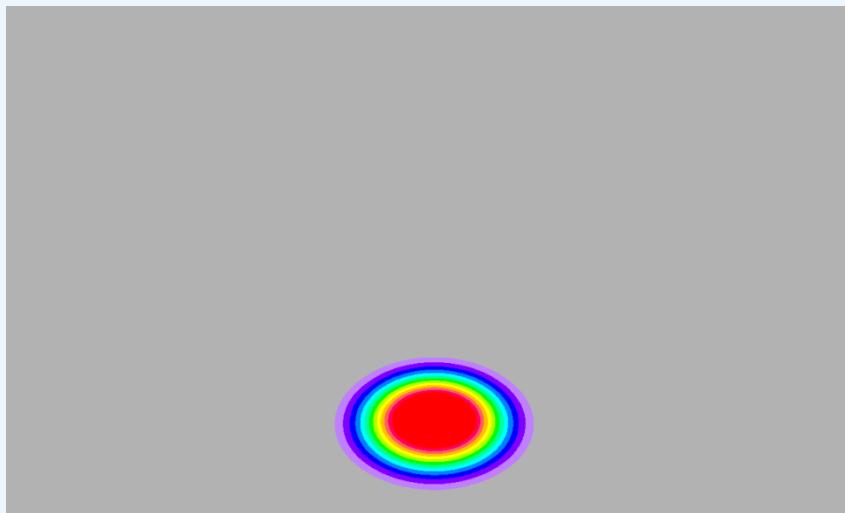




# Explicit .vs. Implicit tri-diag solvers

$\theta'$  t= 1.0 min

$\theta'$  t= 1.0 min

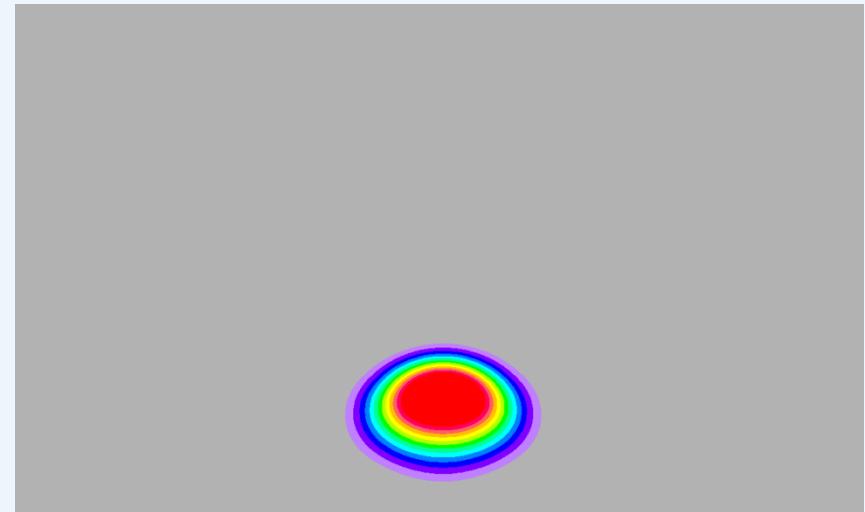
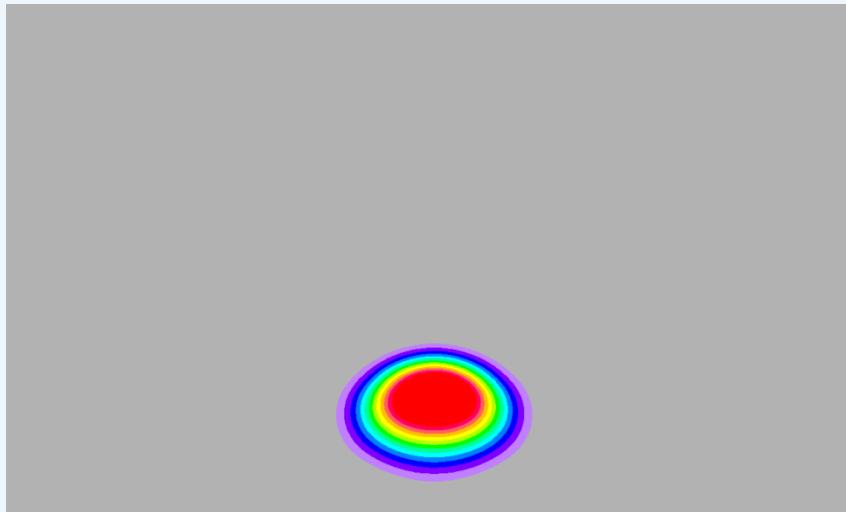




# Explicit .vs. Implicit tri-diag solvers

$\theta'$  t= 2.0 min

$\theta'$  t= 2.0 min

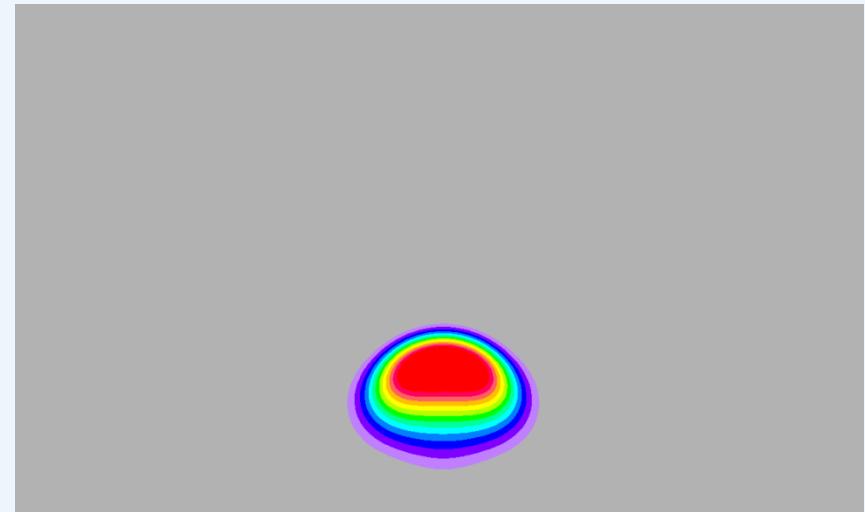
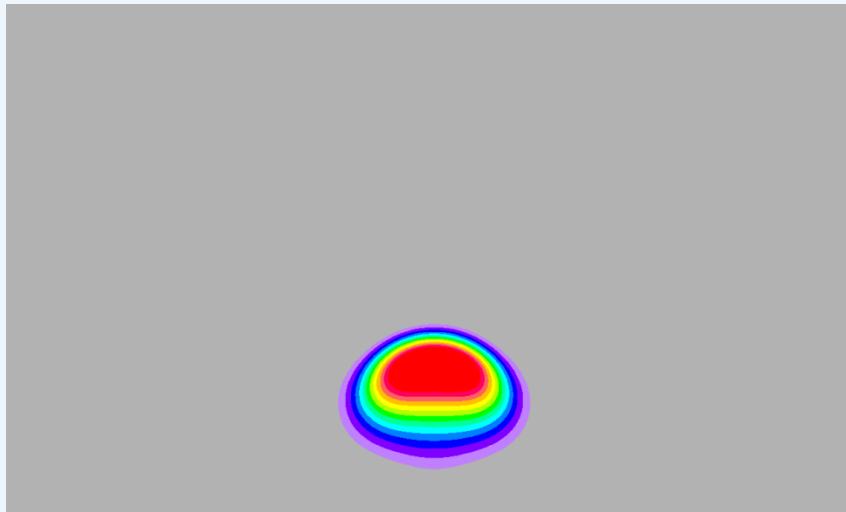




# Explicit .vs. Implicit tri-diag solvers

$\theta'$  t= 3.0 min

$\theta'$  t= 3.0 min

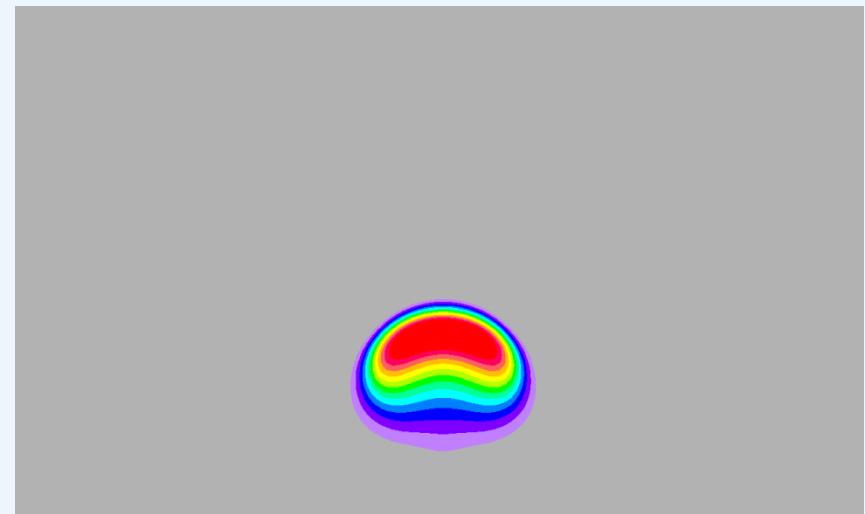
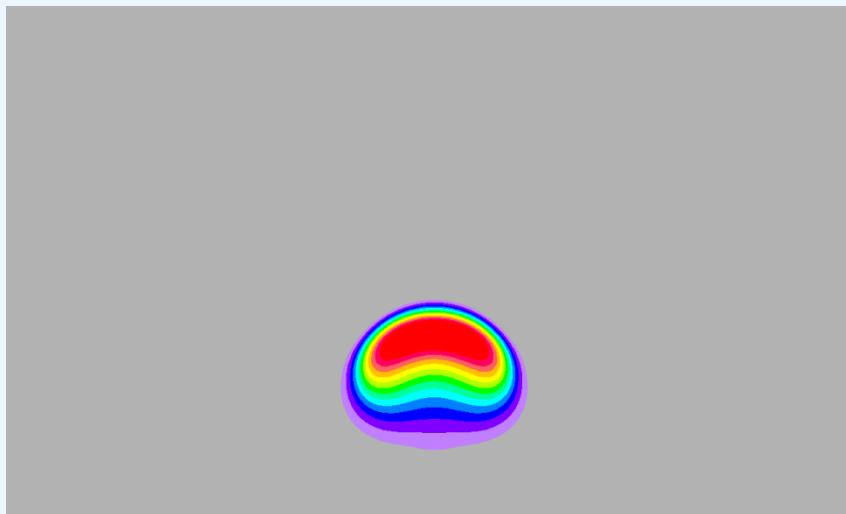




# Explicit .vs. Implicit tri-diag solvers

$\theta'$  t= 4.0 min

$\theta'$  t= 4.0 min

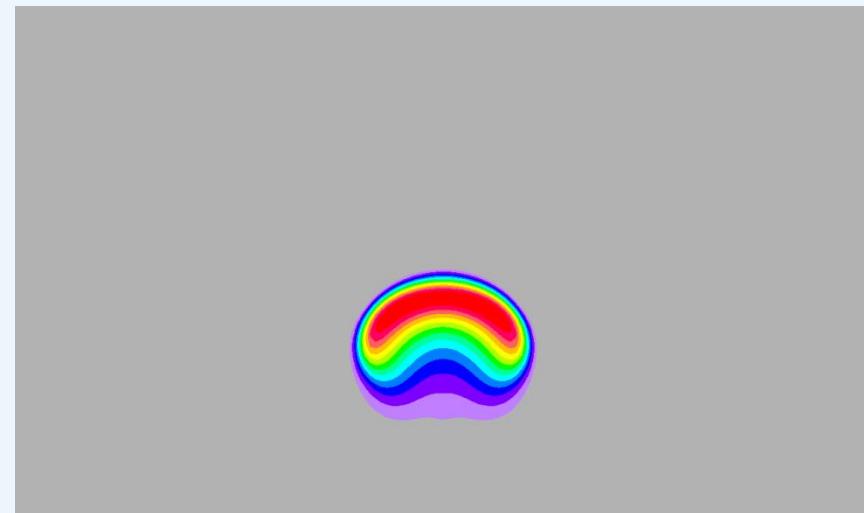
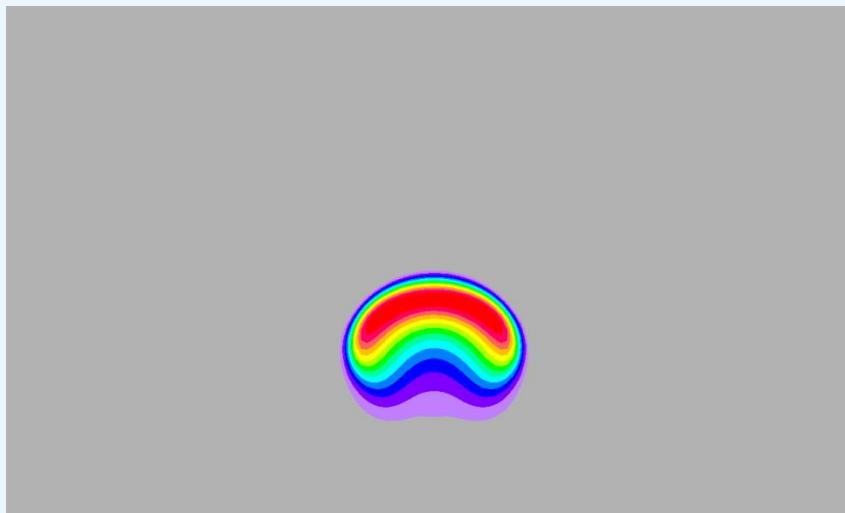




# Explicit .vs. Implicit tri-diag solvers

$\theta'$  t= 5.0 min

$\theta'$  t= 5.0 min

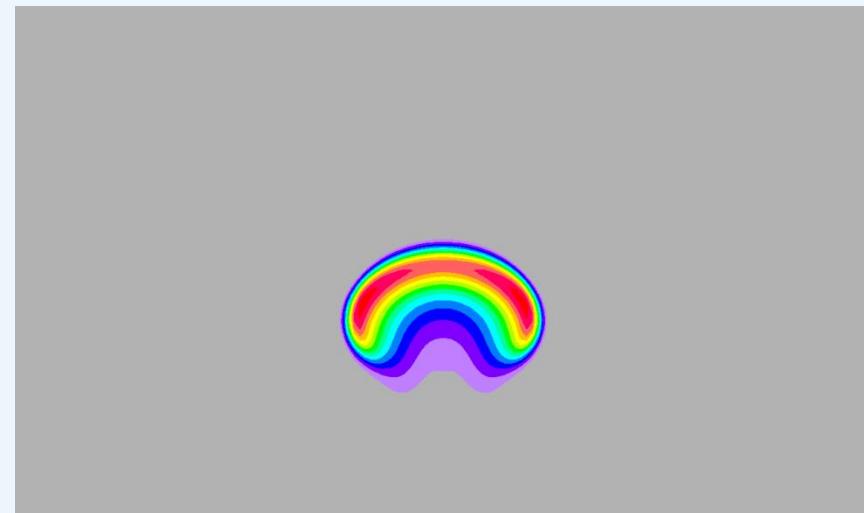
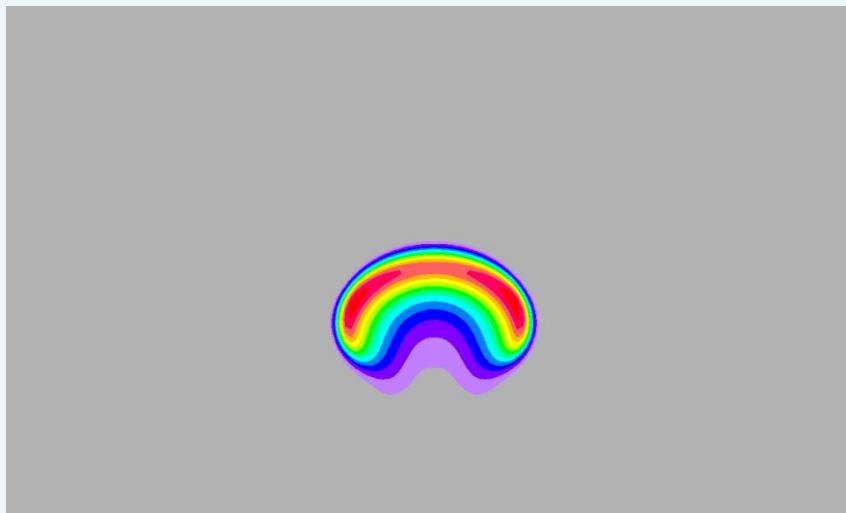




# Explicit .vs. Implicit tri-diag solvers

$\theta'$  t= 6.0 min

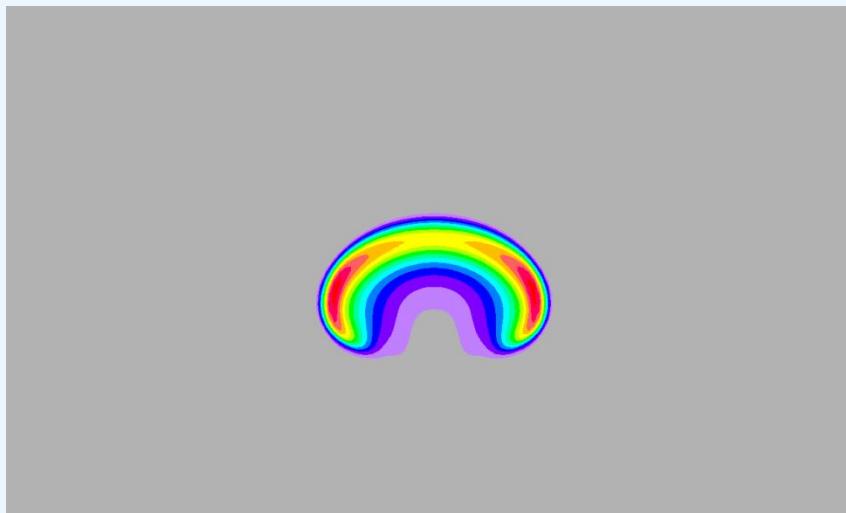
$\theta'$  t= 6.0 min



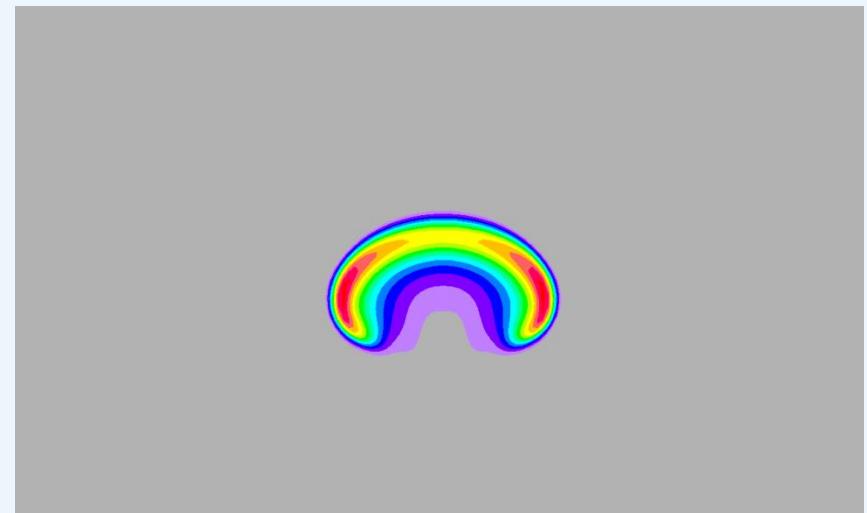


# Explicit .vs. Implicit tri-diag solvers

$\theta'$  t= 7.0 min



$\theta'$  t= 7.0 min

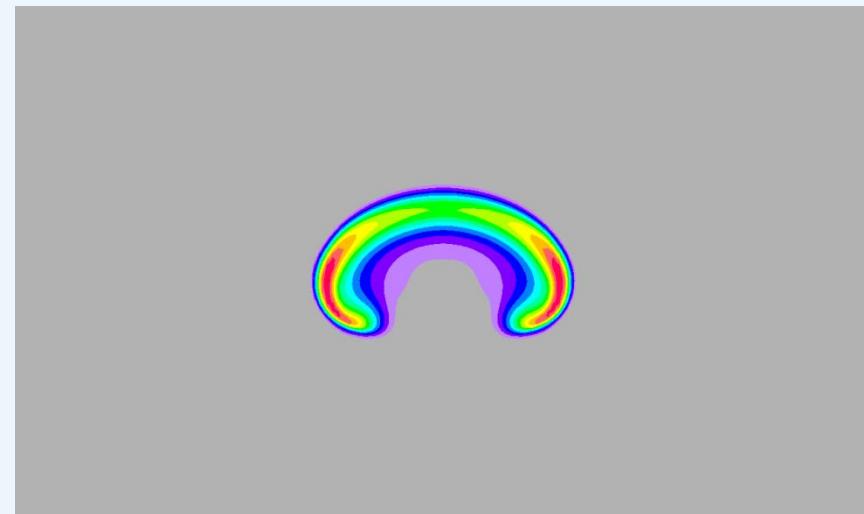
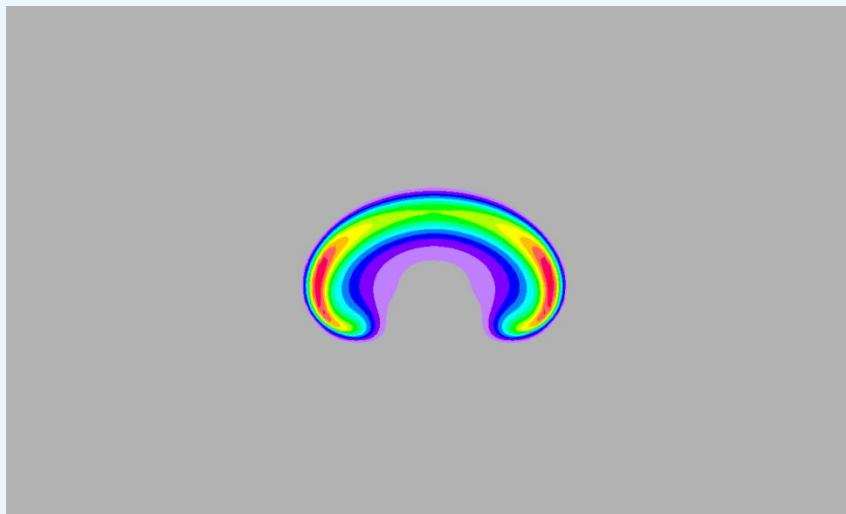




# Explicit .vs. Implicit tri-diag solvers

$\theta'$  t= 8.0 min

$\theta'$  t= 8.0 min

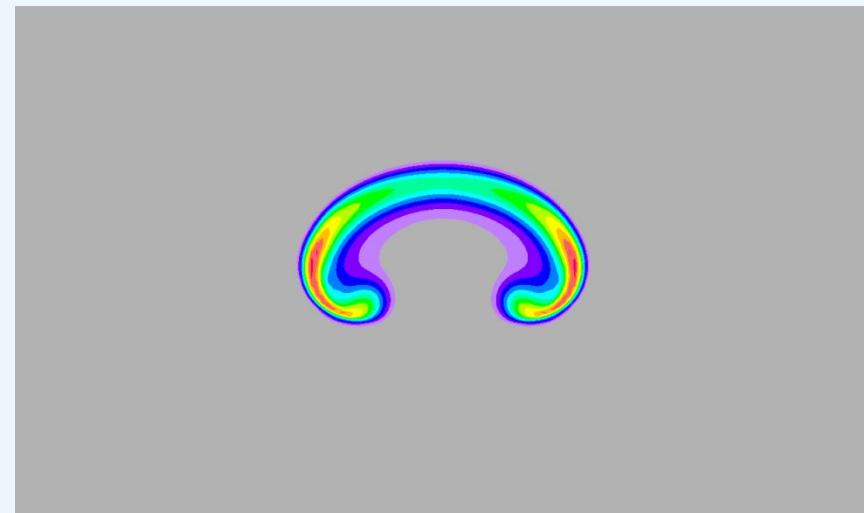
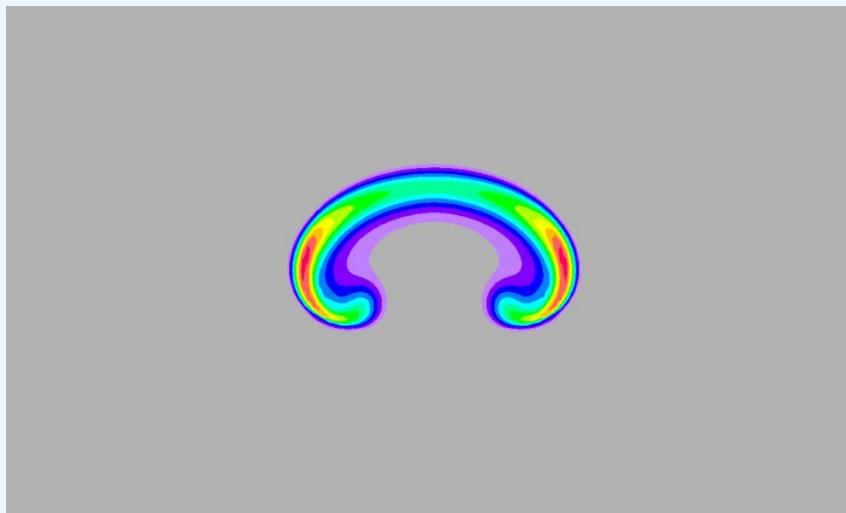




# Explicit .vs. Implicit tri-diag solvers

$\theta'$  t= 9.0 min

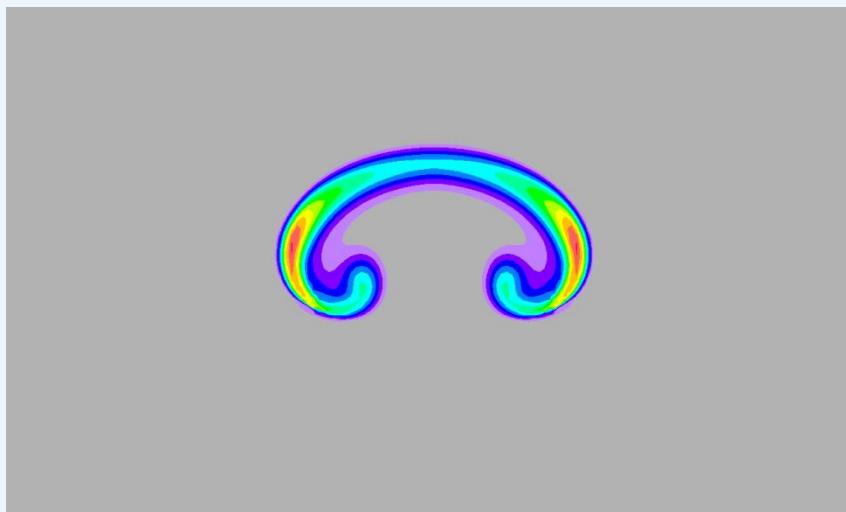
$\theta'$  t= 9.0 min



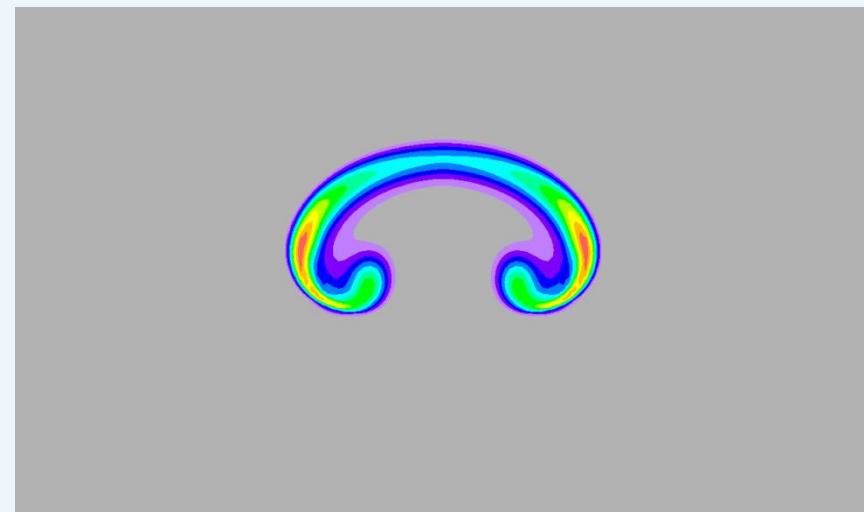


# Explicit .vs. Implicit tri-diag solvers

$\theta'$  t= 10.0 min



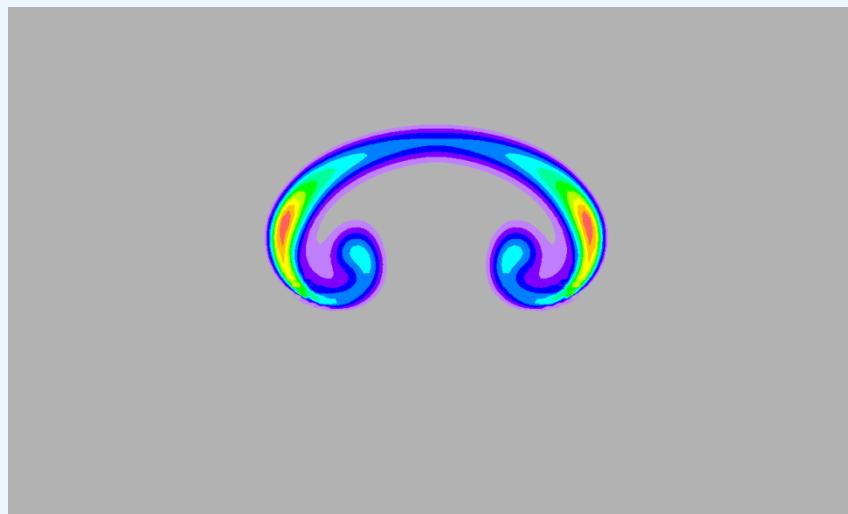
$\theta'$  t= 10.0 min



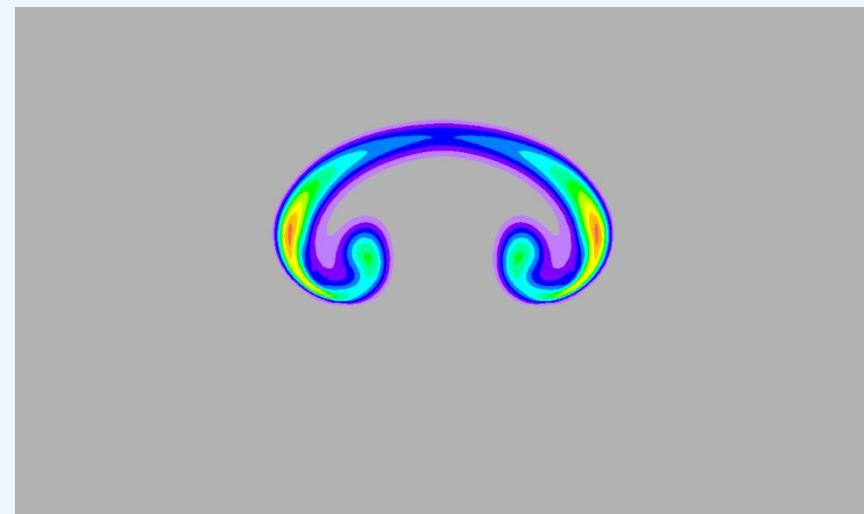


# Explicit .vs. Implicit tri-diag solvers

$\theta'$  t= 11.0 min



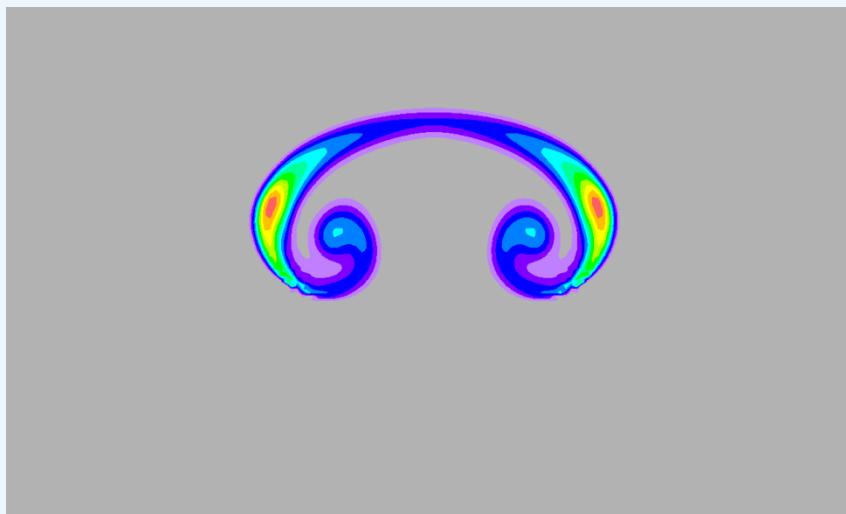
$\theta'$  t= 11.0 min



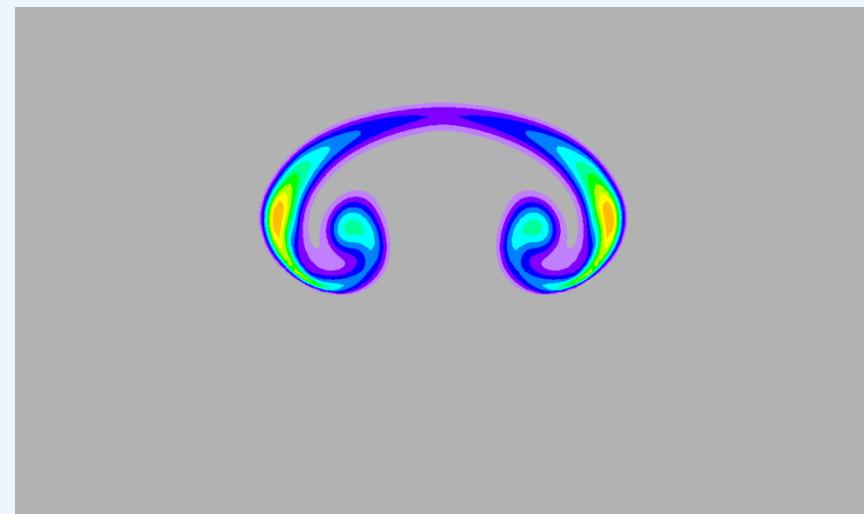


# Explicit .vs. Implicit tri-diag solvers

$\theta'$  t= 12.0 min



$\theta'$  t= 12.0 min

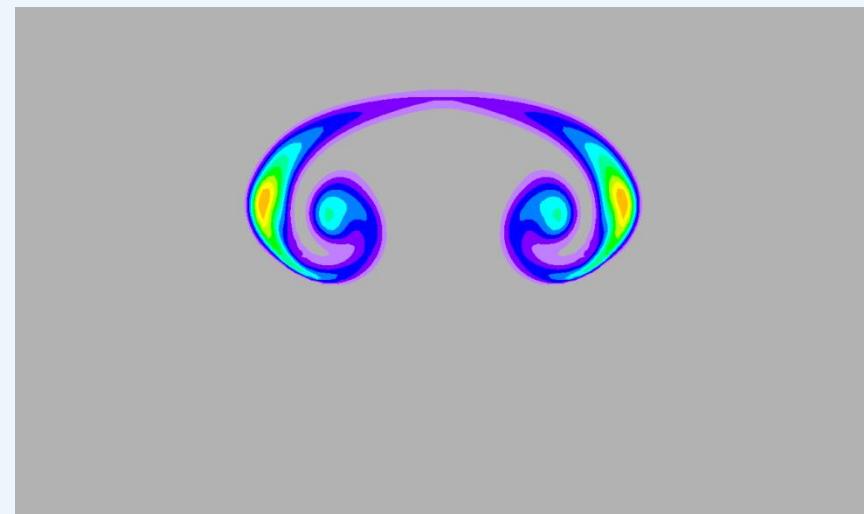
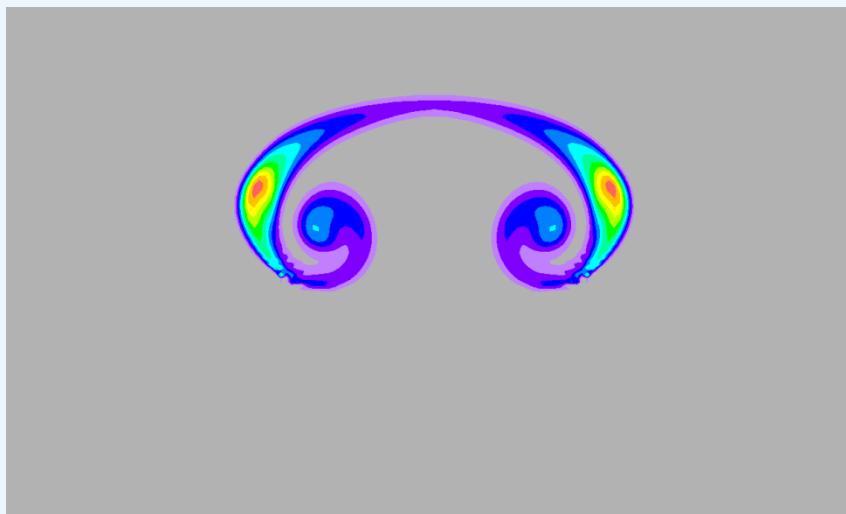




# Explicit .vs. Implicit tri-diag solvers

$\theta'$  t= 13.0 min

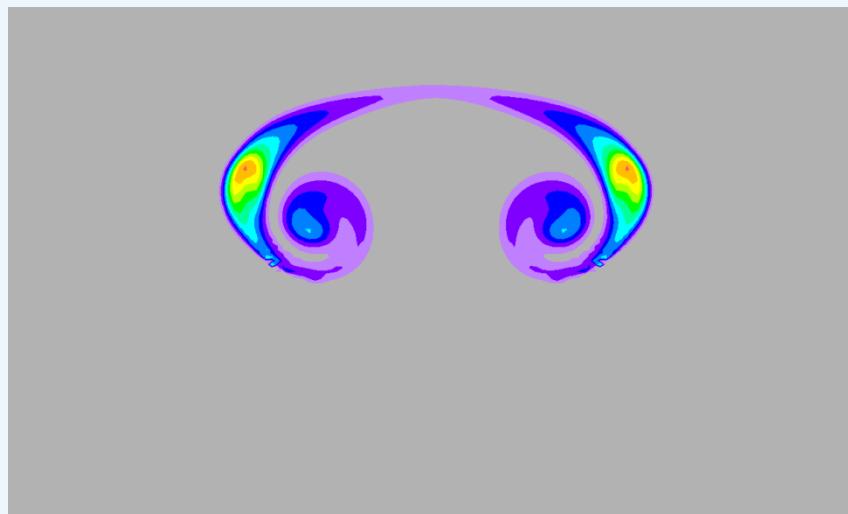
$\theta'$  t= 13.0 min





# Explicit .vs. Implicit tri-diag solvers

$\theta'$  t= 14.0 min



$\theta'$  t= 14.0 min

